# I. DESCRIPTION OF THE DATA BASE

The construction of a model that conforms to known age patterns of mortality requires the assembling of available empirical data. Demographic data from less developed countries are well known for their inaccuracies. As a result, the construction of an input set of empirical life tables was not a straightforward procedure. It required not only the gathering of data on deaths and population by age and sex from censuses, surveys and vital registration systems but also careful analysis and evaluation of the collected information. In addition, for statistical manipulation it was necessary that all data be in standard form. Only data from which death rates by sex could be calculated for age-groups 0-1 and 1-4 and five-year groupings thereafter were included. The collection of base data was undertaken by the Development Centre of the Organisation for Economic Co-operation and Development (OECD) with some updating by the United Nations Population Division.[3] Both census and vital registration data were collected for as many countries as possible. In addition, an attempt was made to incorporate surveys which included population and death data.

On a country-by-country basis mortality rates by age and sex were constructed for all time periods possible, data were carefully evaluated and life tables constructed whenever the data appeared of high quality or reliable adjustments could be made. In this way, 72 input life tables (36 male and 36 female) were constructed for 22 less developed countries. Table 1 gives a list of those life tables, together with life expectancies at birth and at age 10. The set of life tables consists of 16 male-female pairs from 10 Latin American countries, 19 pairs from 11 Asian countries, and only 1 pair from the African continent. Of the 72 life tables, 10 exhibited life expectancies at birth of under 50 years and 10, of 70 years or higher. The remaining 52 all showed life expectancies at birth within the 50- to 69-year range (see table 2). The philosophy underlying the construction of the model life tables was that the models could only be as trustworthy as the input set of country tables. The resulting number of input tables was small but there is reason to believe that the observed age patterns of mortality in those countries are primarily reflections of actual patterns rather than of data errors. This trade-off between data quantity and data quality, however, led to a set of input tables with no representatives from the sub-Saharan African region. This was not unexpected but is none the less unfortunate. Nevertheless, chapter IV illustrates how new model life table patterns can be generated on the basis of some West African data.

Both age misstatement and omission are well recognized problems of census and vital registration data in less developed countries. Evaluation of the data was therefore undertaken for the purpose of selecting a refined data base consisting of relatively reliable data. There are two main approaches to the evaluation of demographic data, namely, checking internal consistency and checking against external data sources. Both approaches were used for evaluating the mortality data for the project. As a general rule, a set of mortality rates was accepted only if application of various techniques and consistency checks provided similar conclusions as to the quality of the data. At times it was necessary to exclude data from some countries because the requisite information was not available to evaluate reliability adequately. Therefore, exclusion of data from the input data set does not necessarily imply that the data are of low quality; it may only indicate the inability to evaluate the data adequately.

Internal consistency checks were of various kinds. Age-sex distributions and age-specific sex ratios were analysed both graphically and by calculation of usual indices for all countries. Data which exhibited high levels of error were excluded. Age patterns of death rates were also graphed. In all known reliable age patterns, mortality declines from a high level during the first days of life to a trough somewhere during the later childhood years and rises again monotonically thereafter (although some populations have a local maximum within the prime age-groups). All mortality curves that did not follow this basic pattern were excluded, as were curves in which the age-specific rates were so erratic (usually when the data source was a sample survey) that it was difficult to determine what the shape of the curve actually was. In addition, Makeham and Gompertz curves were fitted to various sequences of death rates at ages 50 and over and analyses made of the rates of change of mortality from age to age. These analyses were designed to check for differential omission of deaths at the older ages as well as for overstatement of age.

Although the above-mentioned tests provided indications of the quality of the data they were not adjustive in that they did not indicate how to correct the data. However, two variations of the growth-balance method, that of Brass and that of Preston, provided estimates of the completeness of adult registration, under the assumption of non-differential omissions of deaths by age. With care they could therefore be employed to correct the data whenever feasible. These methods are described in detail elsewhere and are therefore not dealt with here.[4]

Tests for external consistency were essentially comparisons with other data sources. These tests were usually of three kinds: comparisons of levels and age patterns of mortality from available surveys and vital registration systems; estimates of completeness of death registration from matching surveys, that is, surveys which match, on

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[3] The base data collected by OECD are described in *Mortality Project: Annotated Bibliography on the Sources of Demographic Data,* vols. 1-3 (Paris, Organisation for Economic Co-operation and Development, 1979).

[4] See S. H. Preston, A. J. Coale, J. Trussell and M. Weinstein, "Estimating the completeness of reporting of adult deaths in populations that are approximately stable", *Population Index,* vol. 46, No. 2 (Summer 1980), pp. 179-202; and Samuel Preston and Kenneth Hill, "Estimating the completeness of death registration", *Population Studies,* vol. 34, No. 2 (July 1980), pp. 349-366.

TABLE 1. LIFE TABLES CONSTRUCTED FOR THE UNITED NATIONS MODEL LIFE TABLE PROJECT
*(Years)*

| Region and country | Period | Male life expectancy at: | | Female life expectancy at: | |
|---|---|---|---|---|---|
| | | *Birth* | *Age 10* | *Birth* | *Age 10* |
| *Africa* | | | | | |
| Tunisia ..................... | 1968-1969 | 52.7 | 56.4 | 52.5 | 56.7 |
| *Latin America* | | | | | |
| Caribbean: | | | | | |
| Trinidad and Tobago ........... | 1920-1922 | 37.6 | 40.1 | 40.1 | 42.6 |
| | 1945-1947 | 53.0 | 50.2 | 55.8 | 52.4 |
| | 1959-1961 | 62.4 | 57.0 | 66.6 | 60.5 |
| Middle America: | | | | | |
| Costa Rica............................ | 1962-1964 | 60.9 | 59.7 | 63.7 | 61.6 |
| | 1972-1974 | 67.5 | 62.6 | 71.2 | 65.7 |
| El Salvador......................... | 1970-1972 | 54.9 | 57.7 | 60.1 | 62.4 |
| Guatemala............................ | 1963-1965 | 46.8 | 50.5 | 48.0 | 51.6 |
| Honduras............................. | 1960-1962 | 40.6 | 46.7 | 44.1 | 49.4 |
| | 1973-1975 | 50.1 | 52.9 | 54.3 | 56.3 |
| Mexico............................... | 1969-1971 | 58.8 | 57.5 | 62.9 | 61.2 |
| Temperate South America: | | | | | |
| Chile................................ | 1951-1953 | 51.6 | 52.0 | 55.6 | 55.7 |
| | 1959-1961 | 54.7 | 54.7 | 60.1 | 59.8 |
| | 1969-1971 | 58.9 | 55.4 | 64.9 | 61.1 |
| Tropical South America: | | | | | |
| Colombia............................ | 1963-1965 | 57.7 | 55.6 | 59.7 | 58.3 |
| Guyana.............................. | 1959-1961 | 59.5 | 55.1 | 63.7 | 58.8 |
| Peru ................................ | 1969-1971 | 53.3 | 58.8 | 57.3 | 62.5 |
| *East Asia* | | | | | |
| Other East Asia: | | | | | |
| Hong Kong.......................... | 1960-1962 | 63.7 | 57.8 | 71.1 | 65.2 |
| | 1970-1972 | 67.6 | 59.7 | 75.2 | 66.9 |
| | 1976 | 69.6 | 61.1 | 76.6 | 67.9 |
| Republic of Korea ................. | 1971-1975 | 59.3 | 52.8 | 66.1 | 60.0 |
| *South Asia* | | | | | |
| Eastern South Asia: | | | | | |
| Philippines.......................... | 1969-1971 | 58.7 | 56.4 | 64.0 | 61.0 |
| Singapore ........................... | 1969-1971 | 65.9 | 57.9 | 72.2 | 64.0 |
| Thailand............................. | 1969-1971 | 56.5 | 54.4 | 60.8 | 57.9 |
| Middle South Asia: | | | | | |
| Matlab (Bangladesh)............ | 1974 and 1976 (average) | 52.6 | 56.1 | 52.8 | 56.4 |
| India ................................ | 1970-1972 | 49.1 | 53.3 | 46.2 | 51.9 |
| Iran................................. | 1973-1976 | 57.2 | 59.5 | 56.6 | 60.8 |
| Sri Lanka .......................... | 1945-1947 | 44.8 | 48.5 | 43.1 | 46.8 |
| | 1952-1954 | 58.4 | 58.6 | 57.3 | 57.4 |
| | 1962-1964 | 62.1 | 59.7 | 62.6 | 59.9 |
| | 1970-1972 | 63.8 | 59.4 | 66.7 | 62.2 |
| Western South Asia: | | | | | |
| Arab country: | | | | | |
| Kuwait................................ | 1974-1976 | 65.9 | 60.2 | 70.3 | 64.4 |
| Non-Arab country: | | | | | |
| Israel: | | | | | |
| Jewish population................. | 1948-1949 | 65.1 | 60.5 | 67.6 | 62.2 |
| | 1960-1962 | 70.8 | 63.4 | 72.6 | 64.9 |
| | 1971-1973 | 70.5 | 62.4 | 73.5 | 65.0 |
| Non-Jewish population ......... | 1971-1973 | 66.6 | 60.4 | 69.9 | 63.2 |

TABLE 2. DISTRIBUTION OF INPUT LIFE TABLES, BY EXPECTATION OF LIFE AT BIRTH

| | Life expectancy at birth (years) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Under 45* | *45-49* | *50-54* | *55-59* | *60-64* | *65-69* | *70 and over* | *Total* |
| Males ............ | 3 | 2 | 8 | 9 | 5 | 7 | 2 | 36 |
| Females......... | 3 | 2 | 3 | 6 | 9 | 5 | 8 | 36 |
| Total .............. | 6 | 4 | 11 | 15 | 14 | 12 | 10 | 72 |

*Source:* Table 1.

a case-by-case basis, deaths reported in a survey with those recorded in a vital registration system; and comparison of levels and age patterns of mortality with those implied by application of indirect estimation techniques to survey or census data on children ever born and children surviving.[5] These external tests often provided estimates of completeness of death registration within specific age segments and as such could be used to adjust the data.

Through these types of tests and checks all available data were evaluated and accepted for inclusion in the refined data base whenever they indicated the data to be of high quality or provided consistent and supportive information to make reliable adjustments. In this way the 36 male-female life tables from 22 less developed countries were selected for inclusion in the refined data base. These life tables, together with brief summaries of the evaluations and adjustments made, are given in annex V to the present volume.

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[5] Various approaches now exist for estimating early-age mortality from tabulations of children ever born and children surviving. For a description of these approaches, see the forthcoming manual being prepared jointly by the Population Division of the United Nations and the Committee on Population and Demography of the American National Academy of Sciences.